CDC Southeast Asia Regional Office Annual Report

FY 2009

CENTERS FOR DISEASE CONTROL AND PREVENTION

At a Glance

The U.S. Centers for Disease Control and Prevention (CDC) has worked closely with the Thailand Ministry of Public Health for more than 30 years, strengthening capacity to prevent and control diseases, and reducing health risk behaviors. CDC's work in Thailand and the Southeast Asia region focuses on HIV/AIDS, tuberculosis, and emerging infectious diseases. The office is also responsible for overseeing the health screening for U.S.-bound immigrants and refugees. Together with many partners, it supports programs that strengthen local skills and public health systems in areas like epidemiology, laboratory, and management science.

This report summarizes many of CDC's accomplishments over the past year, highlighting both internal cross-program synergies and external partnerships. The CDC offices in Thailand are at the Ministry of Public Health campus in Nonthaburi, a suburb of Bangkok. Approximately 20 American staff and 175 Thai nationals work side by side, providing expert technical assistance to a variety of countries, both inside and outside Asia.

Contents

Letter from the Director

The year's sentinel public health event was the emergence of a novel strain of influenza (H1N1) that, in a matter of months, spread worldwide and caused significant morbidity and mortality, especially among children and young adults. With the recent impact of SARS and avian influenza fresh in mind, our counterparts in Asia quickly sought CDC and WHO support to confront the pandemic. During the emergency H1N1 response meeting of ASEAN+3 health ministers in Bangkok, our office played an important role facilitating real-time input from influenza experts at CDC headquarters.

We also helped our Thai colleagues establish an Emergency Operations Center, and our International Emerging Infections Program field sites provided the Thailand Ministry of Public Health (MOPH) with detailed, real-time data on hospitalized admissions for influenza pneumonia. Other ministries of health in Southeast Asia also sought our help during the pandemic to strengthen their capacity to detect and control outbreaks due to human and animal pathogens. The regional response to the H1N1 pandemic once again demonstrated the importance of trust and strong public health partnerships built on years of close collaboration.

Another important event this year was the release of results from the HIV vaccine trial conducted by our colleagues here at the Armed Forces Research Institute of Medical Sciences.This multi-year study was the first and only HIV vaccine trial that demonstrated efficacy. While the protective effect was modest, these results open the door for new areas of investigation and sources of research funding. Our own CDC study of daily pre-exposure prophylaxis (PrEP) with antiretroviral drugs to prevent HIV among injection drug users, done in partnership with the city government of Bangkok and the MOPH, passed a milestone this year with a successful interim review by an independent data and safety monitoring board. We remain hopeful that this study will soon provide evidence to support a new approach for the prevention of HIV transmission in high-risk groups. In the area of HIV programs, our Global AIDS Program significantly expanded regional and global

technical assistance to share Thailand's unique experience and expertise in areas like care and treatment, prevention in most-at-risk populations, and laboratory quality assurance. This regional/global technical assistance model is unique among CDC's Global AIDS Programs and demonstrates how we can leverage U.S. Government and MOPH resources to help other countries learn from Thailand's many successes.

In TB control this year, we worked with partners to complete a landmark study on TB screening and diagnosis in people with HIV. The study led to key revisions in TB screening guidelines in national TB programs in the region and at WHO. This work has important implications for reducing TB transmission and preventing the emergence of multidrug-resistant tuberculosis.

In the area of Refugee and Migrant Health, HIV was officially removed from the list of excludable conditions for immigrants and refugees this year. This helps reduce the stigma of HIV and enables us to focus our resources on other important diseases like TB—the majority of which in the U.S. occurs among foreign-born persons, many of whom come from high TB burden countries in Asia.

While the mission of CDC's Southeast Asia Regional Office has historically focused on infectious diseases, in Thailand, as well as many other countries in the Asia region, the leading causes of quality-adjusted life years lost are attributable to non-communicable diseases, unhealthy behaviors, and injuries.

Stimulating collaboration between CDC, Thailand, and other countries in the region on these areas continues to be a challenge, primarily because of the lack of funding. Despite this challenge, we are pleased to highlight two examples of collaboration in the area of non-communicable diseases that were carried out in Thailand in 2009 (*see text box below*), and we hope to expand work in this important area in the future.

These many accomplishments, combined with our achievements in improving our own CDC lab infrastructure and filling a number of key vacancies, made 2009 an exciting and productive year. I am continually humbled by the dedication and commitment of our staff and partners, and I'd like to take this opportunity to thank you all for your service to CDC and your countries, and wish all good health and continued success in 2010.

Michael D. Malison, M.D., MPA
Director
CDC Southeast Asia Regional Office

Chronic Disease Initiatives

Tobacco Control

As part of a global initiative to reduce tobacco use, the Bloomberg Foundation, in collaboration with the Thailand MOPH, WHO, the CDC Foundation, and CDC's Office of Smoking and Health, carried out a Global Adult Tobacco Survey (GATS) in Thailand in 2009. The survey included data from over 20,000 interviews and found that nearly 25% of Thai adults (45% of men and 3% of women) are current smokers, and that 6 out of 10 smokers are currently trying to quit.

Thailand was the first GATS country to publicly release its data. GATS are being carried out in 13 countries besides Thailand. Prior to this survey, there has been no standardized approach to estimate the prevalence of tobacco use among adults or exposure to second-hand tobacco smoke. These data establish a much needed baseline that can be used to track the impact of tobacco control measures.

Blood Lead Levels in Refugee Children

CDC recommends screening of all refugee children for elevated blood lead levels (EBLL) after arrival in the U.S. Early detection and management of EBLL in children can prevent severe health problems. The occurrence of lead poisoning in refugee children and contributing risk factors in overseas refugee camps has not been fully documented.

In June 2009, the CDC Division of Global Migration and Quarantine led a field investigation to determine EBLL among children living in three refugee camps along the Thailand-Burma border. The results of this project showed EBLL in U.S.-bound Burmese refugee children up to 14 times the levels reported in the U.S. Efforts are underway to prevent refugee children's exposure to potential lead sources, such as car batteries, that were identified through this investigation.

Office of the Director

In 2006, CDC established Consolidated Country Offices (CCOs) in Guatemala, Kenya, and Thailand. Later, China and Kazakhstan were added. The purpose of the new management structure was to strengthen leadership and improve alignment with CDC's Global Health Goals, enhance cross-program collaboration, and implement a standardized approach to business services aimed at enhancing efficiency. This consolidated model was also intended to provide external partners with a clear and consistent focal point for communication and coordination.

The Thailand CCO Office of the Director (OD) currently oversees Global Disease Detection regional activities and six programmatic activities that make up the CDC Southeast Asia Regional Office: the Field Epidemiology Technical Advisor; the Global AIDS Program; the HIV/STD Research Program; the Immigrant, Refugee, and Migrant Health Program; the International Emerging Infections Program (IEIP); and the Regional TB Program. All of the programs engage with other countries in the region in addition to their bilateral collaboration with the Royal Thai Government. The Director serves as the focal point for communications and coordination with the Thailand Ministry of Public Health (MOPH) under

About OD

Established 2007

In-Country Staff
3 CDC direct hires
48 locally employed staff
1 third-country national

Michael Malison, MD, MPA, Director
Pasakorn Akarasewi, MD, MPH,
Co-Director (through January 2009)
Tanarak Plipat, MD, PhD,
Co-Director (from March 2010)

Purpose
To provide leadership, direction, and administrative support for all CDC programs operating in Thailand

FY 2009 Program Budget
$2.3 Million

Dr. Tanarak Plipat is the new Thai Co-Director of the Thailand MOPH – U.S. CDC Collaboration.

Staff were trained in fire safety and the proper use of fire extinguishers, a new fire alarm and PA system were installed, and there are now regular fire drills.

a bilateral agreement, and also serves as the Health Attaché for the U.S. Mission in Thailand.

The CCO/OD supports projects and staff at three sites in Thailand—Bangkok/Nonthaburi, Nakhon Phanom, and Sa Kaeo. At the headquarters on the MOPH campus in Nonthaburi, the CDC Southeast Asia Regional Office occupies 27,000 square feet in three buildings, including office space and BSL-2+ laboratory facilities that support HIV clinical trials and national and regional IEIP activities. With approximately 20 direct-hire staff, 5 contractors, and 175 local employees, the Thailand office is among CDC's largest international field sites. Combining staff salaries and program funds, the total 2009 Southeast Asia Regional Office operating budget was approximately $24 million. Program funds flow through six cooperative agreements and various contracts.

The OD manages a 21-vehicle motor pool, along with an Informatics Unit that provides internal as well as regional IT support. The OD also provides office-wide support for human resources, travel, procurement, facilities management, property management, and financial management.

Major Partners

The OD's major partners include the MOPH Office of the Permanent Secretary and the Bureau of Policy and Strategy. The OD Business Services Officer also works closely with the U.S. Embassy in areas such as travel, human resources, financial management, and procurement. In addition, the office maintains close communications with other U.S. government and international agencies operating in Thailand, such as the Armed Forces Research Institute of Medical Sciences, USAID, and WHO.

Recent Accomplishments

The OD focused on three critical priorities in 2009: Enhanced Safety, Local Staff Development, and Improved Travel Services.

Enhanced Safety

In 2006, CDC's Office of Health and Safety conducted a facility-wide assessment and identified a number of areas where improvements were needed. Chief among these were bio-safety issues in the labs and life-safety issues in both the labs and the offices. The OD embarked on a three-year process to address these needs with support from GDD, IEIP, and other CCO programs; the CDC Buildings and Facilities Office; and the local U.S. Navy Facilities Engineering Command. By the end of 2009, the list of accomplishments in this priority area included:

- Both the HIV and IEIP labs were completely gutted and renovated to bring them into compliance with modern safety standards, and a bio-safety Committee was established.
- Fire escapes were installed at all labs and office buildings.
- Ergonomic furniture was procured and ergonomic consultation was made available to all staff.
- Staff were trained in fire safety and the proper use of fire extinguishers, a new fire alarm and PA system were installed, and there are now regular fire drills.
- Defibrillators and first-aid kits were installed; staff have been trained in CPR and defibrillator use.
- All floors in the primary office building now have 24/7 video surveillance cameras to enhance security.

Local Staff Development

CDC's most valuable resource is its staff, and as CDC's second-largest overseas operation in terms of number of employees, the Southeast Asia Regional Office places a high priority on recruitment, retention, and employee development. CDC is exceptionally proud of the locally employed staff, many of whom are recognized international experts and serve as an essential component of the regional and global technical assistance team.

This year's staff development activities included:

- 233 person-days of training for locally employed staff (LES).
- 175 staff (LES + direct-hire) attended 92 external courses, trainings, seminars, or conferences.
- Nine admin staff attended a Federal Appropriations Law training in Beijing.
- 10 admin staff attended Advanced Grants Management training in Cambodia and India.

- Three LES were converted to Full-time Equivalent (FTE) appointments.
- Three LES received globally competed awards from CDC's Coordinating Office for Global Health.
- 79 LES received Embassy Performance Awards.
- A highly successful "TUC Staff Appreciation Day" was held in December (*see photo inside front cover*) to acknowledge everyone's hard work, have some fun, and promote teamwork across all programs.

Improved Travel Services

The OD Travel Unit, with support from the U.S. Embassy, processes foreign and domestic travel for all CDC Southeast Asia Regional Office staff. As programs have grown and the office's mission has become more regional, the volume of travel has increased significantly. In 2009, the travel unit effectively executed 1,649 travel requests to 34 countries, a 15% increase over 2008.

To address the challenges associated with this increased work load, the Travel Unit hired an additional travel clerk. It also conducted a customer satisfaction survey to solicit input on performance and identify areas for improvement. A work group was convened of travel unit staff and travel arrangers from all program areas to analyze the survey results and identify potential solutions. Recommendations from the work group were implemented and are now being integrated with the Embassy's new electronic travel system.

Other Activities and Accomplishments

Memorandum of Agreement with MOPH

CDC has had a formal Memorandum of Agreement (MOA) with MOPH since 1999. This MOA governs bilateral activities with Thailand and includes language that defines a governance structure with Thai oversight, staffing arrangements, approvals for scientific work, and arrangements for office and lab space. As the current MOA expiration date drew near in July of this year, CDC was informed by the State Department and the Department of Health and Human Services (HHS) that it would need to formalize the approval process because the MOA is a "binding agreement" in a legal sense. As such, the MOA constitutes a treaty, requiring State Department review and approval.

The revised MOA has now been approved by the State Department, HHS, and CDC/Atlanta. An extension has been granted by both governments while the current draft is reviewed by the Thai Ministries of Foreign Affairs, Commerce, and Public Health. It will ultimately need to be approved by the Thai Cabinet before it can be signed.

Financial Management

Helped by favorable exchange rates, the OD reduced infrastructure costs in 2009 by $250,000, enabling programs to redirect those funds to support other work. The financial unit assisted programs in tracking nearly $9 million in 33 separate accounts and processed nearly 600 cables for funding requests and granting country clearances.

The OD ensured that the six cooperative agreement recipients in Thailand received continuation awards in 2009; MOPH also received a supplemental award for H1N1 funding. OD staff provided training to MOPH on management of cooperative agreement funds, leading two program implementation reviews, and directing weekly meetings with cross-program staff to ensure a consistent and standardized approach to financial management.

Working through the Embassy, the OD provided fast and effective procurement services for all programs, managed customs clearances, and conducted a property inventory of 900 bar-coded items. The OD staff also coordinated a training on a new property management software system for LES participants from four countries in the region.

2006: A facility-wide safety assessment identified many needed improvements, including biosafety and life-safety issues in the laboratories. During the following three years, these needs were addressed, with support from GDD, IEIP, and other CCO programs; the CDC Buildings and Facilities Office; and the local U.S. Navy Facilities Engineering Command.

The Motor Pool traded four old vehicles for four new ones, including one with four-wheel drive for travel to refugee camps along the Burma border.

Informatics Unit

The Informatics Unit is part of the Office of the Director. Established in 1991, the unit is an integral part of the effort to prevent HIV/AIDS, infectious diseases, and emerging health threats in the region. The unit's primary role is to complement research, laboratory, surveillance, administrative, and other programmatic activities.

The unit takes a lead role on sampling and database design, applications development, computer-assisted data collection, data management, statistics, geographical information systems, and graphics. Its efforts form the foundation for many scientific publications, posters, and presentations. Other capacity building activities include training on use of software and on data management and analysis, and support for website development.

In FY 2009, the Informatics Unit provided data support and statistical consultation to Southeast Asia Regional Office activities, including:

- Data management for interim efficacy review of the Tenofovir trial among injecting drug users in Bangkok
- Data management for the Household Influenza Transmission Study
- Data management systems for the ongoing men who have sex with men cohort study
- Investigation and recommendations regarding the use of netbook computers for data collection in the IEIP surveillance system
- Technical assistance for PDA-based data collection in HIV surveys to partners in Laos
- Technical assistance in developing an integrated database system for the national HIV surveillance system and modifying the HIVQUAL software in Papua New Guinea
- Consolidation of administrative databases to an MS-SQL server
- Implementation of a centralized SMS-based call tree system
- Sharing of a TUC-developed financial information system with IEIP/China
- Expansion of the wide area network to cover two additional provincial offices in Sa Kaeo and Nakhon Phanom, including video conferencing capability
- Implementation of an FTP server to support large file transfers
- Implementation of an IIS server to support intranet web-based information systems
- Upgrading of leased line to fiber optic for faster internet speeds
- Ongoing evergreening of IT infrastructure
- Expansion of the Silom Clinic

2009: After being gutted and renovated to bring them into compliance with modern safety standards, the improved laboratories now support HIV clinical trials and emerging infectious disease activities. A bio-safety committee has also been established.

OD Priorities for FY 2010

With the completion of the lab renovation project this year, and the secondment of Dr. Tanarak from MOPH to back-fill the year-long vacancy of the critically important Thai Co-Director position, the OD can focus in 2010 on bringing the MOA negotiations to a successful conclusion. Several programs will also be losing key direct-hire staff in the coming year through required tour rotations, and the OD will be working hard to support recruitment efforts and minimize the impact of any gaps in administrative or technical coverage.

The OD will need to enter into negotiations with MOPH to address the current shortage of space for offices and storage. Existing multi-year cooperative agreements with MOPH and the Bangkok Metropolitan Authority expire in 2011, so new Funding Opportunity Announcements will be needed to replace these agreements. The OD will continue efforts to identify and eliminate any inefficiencies in business services processes, and expand its regional role as a resource for LES staff development.

Global Disease Detection

Global Disease Detection (GDD) is CDC's most visible and comprehensive strategy for identifying and containing emerging infections around the world. The U.S. CDC Division of Global Disease Detection and Emergency Response has been designated by WHO as a Collaborating Center for Implementation of International Health Regulations (2005) National Surveillance and Response Capacity. A central focus of GDD is the establishment and expansion of Centers in WHO regions around the world. GDD Regional Centers are currently located in China, Egypt, Guatemala, Kazakhstan, Kenya, and Thailand. In 2009, activities were initiated to establish India as the newest Center.

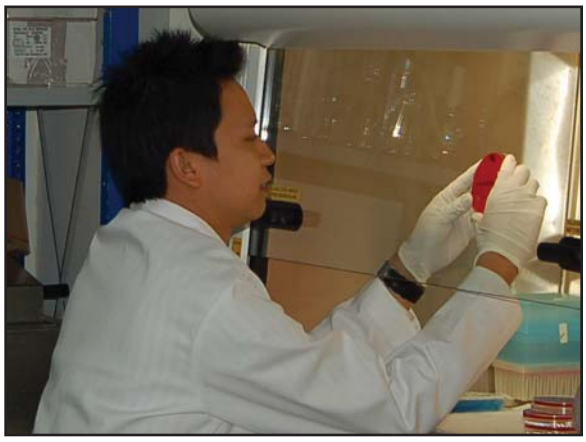
About GDD in Thailand

Established in 2006

Susan Maloney, MD, MHS,
GDD-Thailand Coordinator

GDD Core Capacities in Thailand
Field Epidemiology Training Program
International Emerging Infections Program
Laboratory Diagnostics and Systems Development
Influenza Prevention and Control
Emergency Preparedness and Response
Zoonotic Disease Investigation and Control

The GDD Regional Center in Thailand is headquartered on the Thailand Ministry of Public Health (MOPH) campus near Bangkok. Principal partners include Thailand MOPH and Ministry of Agriculture and Cooperatives, WHO regional offices in Southeast Asia and the Western-Pacific, major academic institutions, multi-



In 2009, CDC's Global Disease Detection Regional Center in Thailand built laboratory capacity across seven countries, enabling countries to conduct new tests and respond more effectively to infectious disease threats.

lateral organizations, U.S. government agencies, nongovernmental institutions, and multiple programs at CDC/Atlanta headquarters.

Building Disease Detection and Response Capacity

GDD-Thailand builds upon an established CDC presence, linking together the strengths of the overseas CDC programs with country and regional partners. This integrated approach reduces the time it takes to detect and control public health threats—relying on local rather than remote resources to develop expertise in emerging infectious disease detection and response; field epidemiology training; pandemic influenza preparedness and response; laboratory systems and biosafety; zoonotic disease research and control; and health communications and information technology.

Responding to Health Threats

Together with WHO, ministries of health, and other partners, GDD-Thailand helps Thailand and Southeast Asia detect and respond to serious public health threats ranging from influenza and tuberculosis to zoonotic and vector-borne diseases such as anthrax, brucellosis, dengue, malaria, and Nipah and chikungunya viruses. Activities promote evidence-based decision making and proven strategies are shared widely.

Connecting Resources

GDD-Thailand engages its extensive partner network to harmonize strategies and leverage resources to improve detection and response to emerging infectious diseases. GDD-Thailand is connected to GDD Regional Centers in other WHO regions and has access to more than 2,500 CDC experts in more than 50 countries. The GDD Operations Center and Technical Support Corps, located at CDC's headquarters in Atlanta, provide technical resources and support for outbreak response.

Making an Impact: (2006 –2009)

Since 2006, GDD-Thailand has supported:

- Effective response to 39 outbreaks, at the invitation of WHO and affected countries
- Ongoing disease surveillance activities covering 1.2 million people
- Establishment of diagnostic testing capacity for 27 pathogen-specific tests
- Discovery of 12 pathogens new to the region or the world
- Graduation of 27 future global health leaders from six countries as part of the two-year Field Epidemiology Training Program
- Training of 7,421 public health officials from over 20 countries in short-term epidemiologic and laboratory workshops
- Development and implementation of WHO-endorsed standardized teaching curriculum for Pandemic Rapid Response Teams and Respiratory Infection Control in Health Care Facilities

GDD-Thailand has collaborated with WHO and the Thailand MOPH to develop a joint regional stockpile of emergency response supplies (including medical supplies and personal protective equipment). Supplies were used in Burma as part of the collaborative response to Hurricane Nargis in 2008

Field Epidemiology Training

In 1980, the Royal Thai Government, in collaboration with WHO and CDC, established a Field Epidemiology Training Program (FETP) in the Thailand MOPH. The program aims to improve the health of Thais by training physicians to become professional epidemiologists. Graduates of the program use their newly acquired knowledge and skill to identify and respond to outbreaks. The FETP is based upon the CDC's Epidemic Intelligence Service, an on-the-job program that teaches field epidemiology and provides opportunities to acquire and sharpen epidemiological skills.

To assist with establishing this program, the CDC posted an epidemiologist to work with MOPH from 1980 to 1986. For the next 20 years, CDC provided training to Thai FETP fellows and staff. In 2006, the program became international when it recruited trainees from several Southeast Asian countries. Because of the program's increased role and requests for assistance to expand field epidemiology training in Southeast Asia, CDC re-assigned an epidemiologist to serve as a technical advisor to the Thai FETP and countries in the region interested in starting an FETP.

The Thailand program recruits about 10 physicians and veterinarians per year to participate in a two-year post-graduate fellowship in field epidemiology and public health practice. The philosophy of the

About FET

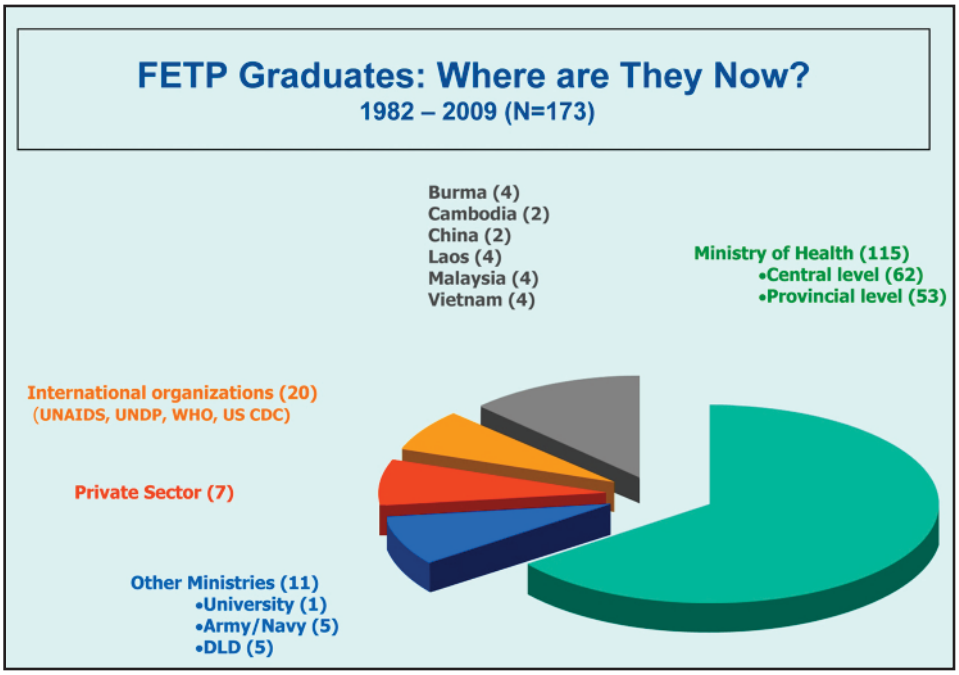
Established in 1980

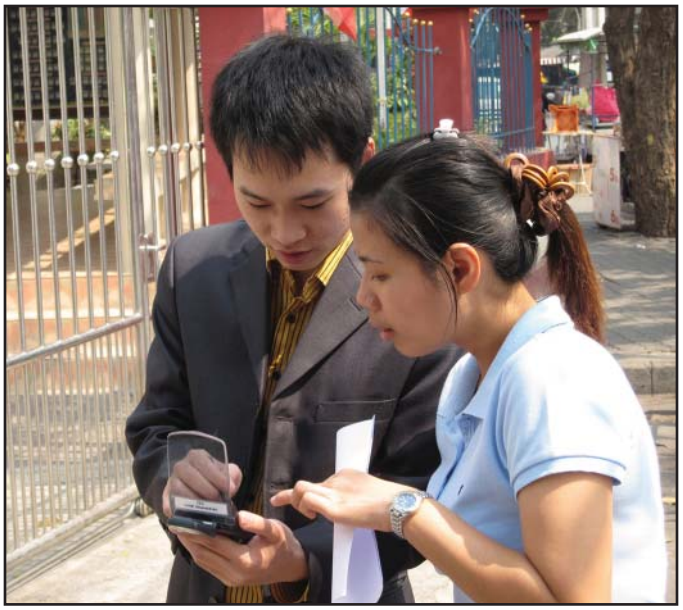
In-country Staff
1 CDC direct hire
2 locally employed staff

Alden Henderson, PhD, MPH,
Technical Advisor

Purpose
To strengthen the capacity of Southeast Asian Ministries of Health to identify, control, and prevent disease through training and technical assistance in field epidemiology and public health practice

FY 2009 Program Budget
$600,000





FETP fellows conduct a rapid public health assessment and record information on a personal digital assistant.

program is "learning by doing" and fellows spend about 75% of their time doing fieldwork and the remainder in the classroom. Fieldwork consists of investigating disease outbreaks, evaluating surveillance systems, and conducting applied research projects. Class work includes attending lectures in epidemiology and biostatistics, participating in a journal club, and giving presentations on epidemiologic methods. Over the course of two years, a fellow investigates about 12 outbreaks, evaluates one surveillance system, and conducts two field research projects. The program is accredited by the Thai Medical Council and graduates are eligible for Board Certification in Preventive Medicine.

In its 30 years of operation, the Thai FETP has graduated 173 fellows, 20 of whom are from other countries. There are 135 (81%) graduates employed by a Ministry of Health program and 20 (12%) employed by a nongovernmental organization with a public health focus.

Major Partners

In addition to the Thailand MOPH – U.S. CDC Collaboration (TUC), the Thai FETP advisor collaborates with the FETPV (FETP Veterinary) program at the Department of Livestock Development in the Thailand Ministry of Agriculture and Cooperatives, the Mekong Basin Disease Surveillance (MBDS) Network, the South Asian Field Epidemiology and Technology Network (SafetyNet – formerly known as The International Group for Epidemiologic Response, or TIGER), and the Regional Emerging Disease Intervention (REDI) Centre. Other partners in Thailand and the region include the WHO Community Surveillance and Response Sub-Unit in Bangkok, USAID, and the Food and Agriculture Organization (FAO). The CDC FETP advisor also works with FETPs in China's Yunnan Province, Laos, and Vietnam.

Recent Accomplishments

In 2009, the advisor's activities centered upon implementing many of the projects that were created or funded in the previous year. One major achievement is the establishment of a web-based publication called Outbreak and Surveillance Investigation Report (OSIR). The journal published its inaugural issue in November 2008 and followed with the second issue in November 2009. In 2009, the operational components were addressed by creating an editorial board and hiring a managing editor. The online journal (**http://osirjournal.net**) provides a venue for communication of public health information and disease reporting in Asia. The journal plans to publish four issues a year. The advisor provided ongoing support by soliciting, reviewing, and editing manuscripts for publication; and by creating a web page, hiring a managing editor, and recruiting associate editors.

Zoonotic diseases, and integration of human and animal surveillance, are rapidly developing areas. In 2008, the advisor assisted with developing the curriculum and obtaining funds to support training for FETPV staff and fellows to develop case studies on zoonotic diseases. In 2009, these studies were initiated and will be completed in time for the 2010 FETPV training course. In collaboration with FETPV, two new projects were implemented in 2009: enhanced surveillance for the re-assortment of influenza viruses, and a study that examines market factors that influence movement of animals across borders. The advisor worked closely with FAO, the Department of Livestock Development, and the staff and fellows in the FETPV to implement these projects.

FETP created OSIR (**http://osirjournal.net**), a new web-based publication, as a venue for communication of public health information and disease reporting in Asia.

One key activity of field epidemiology training is evaluating a disease surveillance system. Here, fellows and staff review hospital medical records to assess accuracy of diagnosis and percentage of cases reported to the surveillance system.

The advisor also worked with SafetyNet to convene a workshop among epidemiologists and veterinarians to enhance sharing of information on unusual occurrences of disease, as well as joint responses to disease investigations.

In other regional work, the advisor helped Vietnam FETP with training of fellows by providing lectures in short courses on foodborne outbreak investigations, evaluating and establishing surveillance systems and statistics, and offering a short course on mentoring for field supervisors.

Additional FETP projects requiring guidance from the advisor included responses to a Bangkok pub fire, the sudden deaths of two foreign tourists, control of an H1N1 outbreak among Thai students, identification of activities that led to transmission of occupational disease among mushroom farmers, and evaluation of pneumonia surveillance in adjoining provinces of Thailand and Laos.

In collaboration with TIGER and the MBDS human resource coordinator, the advisor completed country work plans for six MBDS countries. In the work plans, the countries identified gaps in human resources for disease control and prevention activities. MBDS provided funds to each country for activities to address these gaps. As an example, the Cambodia CDC trained provincial rapid response teams in epidemiology and outbreak response. In 2008, the advisor obtained funding from the Nuclear Threat Initiative to create a training module on informal information. In 2009, the module was completed and piloted among FETP fellows and MOPH Bureau of Epidemiology staff. The module describes informal information and its sources, provides case studies to show the usefulness of informal information, and gives guidance on triaging and verifying informal information. The goal is to increase the use of informal information in national disease surveillance systems.

Many of these activities were joint efforts between staff from CDC's Division of Global Public Health Capacity Development, TUC, Thai FETP, FETPV, and PROMed.

Current Activities

The advisor continues to mentor fellows on a wide variety of subjects, including conducting outbreak investigations, evaluating surveillance systems, communicating findings to the scientific community, and preparing manuscripts for publication. As in FY 2008, other countries in the region receive the advisor's assistance in establishing new FETPs or strengthening existing ones. Recruitment of fellows for the 2010 Thailand FETP cohort is also ongoing.

Plans for FY 2010

In the coming year, a major activity will be to diversify the Thai FETP curriculum to include elements of management, leadership, and communication. Other activities will include responding to requests from Thai medical and public health organizations to provide epidemiology training to medical and public health professionals, incorporating adult learning approaches in training modules, conducting cross-border activities such as investigating outbreaks and determining vaccine coverage among residents who live in border provinces, strengthening the FETP alumni association, developing a laboratory training module for epidemiologists, publishing fellows' work in peer-reviewed journals, and continuing the expansion into zoonotic diseases.

Global AIDS Program

Global AIDS Program's Asia Regional Office (GAP/ARO) works with its Royal Thai Government (RTG) partners to develop, expand, and build capacity to run programs for prevention, surveillance, and care and treatment of HIV. Many of its innovative initiatives affect national strategy and health systems.

The activities center on best-practice guidance and sustainable technical approaches, human capacity building, quality systems, and monitoring and evaluation.

Thailand's HIV epidemic continues to be concentrated among its most-at-risk populations: men who have sex with men (MSM), injecting drug users (IDU), and sex workers. GAP staff coordinate sustainable projects targeting these groups, as well as those aimed at improving laboratory testing and collecting strategic information (SI).

Increasingly, GAP/Thailand has focused part of its work on supporting CDC and RTG staff to provide technical assistance (TA) to other countries. Successful models developed and implemented in Thailand are adapted to fit national HIV programs in the region and in Africa through direct,

GAP/ARO supports the transfer of successful models developed and implemented in Thailand to national HIV programs in the region and in Africa. Here, a senior consultant from the Thai MOPH provides technical assistance on lab accreditation to Ethiopian health ministry staff in Addis Ababa.

About GAP

Established 2001

In-country Staff
4 CDC direct hires
37 locally employed staff
1 contractor

Kimberley Fox, MD, MPH,
Director (through July 2009)
Mitchell Wolfe, MD, MPH,
Director (from August 2009)

Purpose
To develop and expand innovative programs for surveillance, prevention, and treatment of HIV and related diseases, as a partner in the U.S. President's Emergency Plan for AIDS Relief, for Thailand and throughout the world.

FY 2009 Program Budget
$3.9 Million

Prin Visavakum


Prin Visavakum

Prin Visavakum is GAP's project coordinator for community-based HIV/AIDS prevention among special populations. Partly thanks to his efforts, small numbers of injecting drug users (IDU) throughout Bangkok are taking the first steps toward getting tested for HIV infection.

IDU behaviors are notoriously difficult to change. HIV prevalence among IDUs has remained higher than 40% for a decade. "Sometimes it helps to look beyond, to look at root causes," he says. "Once the reasons for drug abuse are addressed, then we can start to think about preventing disease."

GAP's approach, spearheaded by Prin, centers on the assumption that IDUs understand fellow IDUs better than anyone else. The Bangkok Metropolitan Administration (BMA) now employs IDU outreach workers at some of its methadone clinics. Historically, this approach has been taken only by nongovernmental organizations in Thailand. Prin has helped demonstrate that a government agency and IDU peer staff can work well together.

Organizations from inside and outside Thailand make study visits to the BMA office that houses IDU outreach staff. Prin presented the BMA program at an international conference in Vancouver. Countries in Africa are looking at the model and have invited GAP to provide technical assistance.

In May of 2009, Prin was honored with a Global Health Achievement Award, one of five awards worldwide given this year by CDC headquarters in Atlanta celebrating outstanding, talented, and dedicated locally employed staff.


Combining to implement the Lao National HIV/AIDS Plan are people living with HIV/AIDS, Lao Ministry of Health staff, GAP/ARO, and WHO, shown here visiting a clinic in Luang Prabang.

person-to-person TA. Current TA addresses laboratory, SI, quality improvement of HIV care, MSM and IDU outreach, prevention of mother-to-child transmission (PMTCT), and pediatric HIV disclosure. In 2008, the office changed its name to GAP/ARO, reflecting this expanded mission.

Major Partners

GAP/ARO partners with the TB Program on models for improved TB/HIV services and the HIV/STD Research Program on surveillance of MSM.

In Thailand, Laos, and Papua New Guinea (PNG), GAP/ARO jointly plans activities with USAID and other U.S. government agencies, as partners in the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). The program's major collaborator in Laos and PNG is WHO. In Thailand, GAP/ARO works with MOPH, the Bangkok Metropolitan Administration (BMA), and provincial health offices in many parts of the country. For specific projects, the program also collaborates with other RTG agencies, NGOs, universities, and WHO.

Recent Accomplishments

In the area of HIV **prevention**, GAP/ARO supports several services aimed at MSM. Outreach models using peers and popular opinion leaders are under development in four Thai provinces. Rapid HIV counseling and testing, with same-day results, is also being piloted in all GAP/ARO sites to increase the number of MSM accessing testing and learning about their HIV status.

GAP/ARO works both in the community and in clinical settings. At MSM venues and special events, GAP/ARO programs provide basic information about HIV/AIDS and STDs, risk reduction, disclosure to partners, and referrals to HIV/STD services. The programs also promote the use of condoms and lubricants, screening for STDs, and voluntary counseling and testing. MSM-friendly drop-in centers and clinics have been established to provide such services.

Capacity building forms an integral part of GAP/ARO support for MSM, including sensitivity training for clinic staff, MSM STD clinical training for health care

A behavior change communications training for outreach workers in Khon Kaen, Thailand is one of several GAP-supported prevention activities aimed at building capacity of men who have sex with men to respond to the HIV epidemic.

workers, MSM risk reduction counseling training for counselors, and behavior change communications training for outreach workers. Staff are also involved in networking through quarterly technical advisory committee meetings. GAP/ARO works closely with the Global Fund to Fight AIDS, TB, and Malaria (GFATM) in Thailand, and provides technical support for implementation of MSM programs funded by GFATM.

As with MSM, GAP/ARO has strengthened outreach for IDU. After the program helped demonstrate that a government agency and IDU peer staff can work well together, peer outreach has become a routine government service based at many of BMA's methadone clinics (see sidebar, *Prin Visavakum*). In 2009, GAP/ARO began technical support for a respondent-driven sampling survey designed to estimate the number of IDU and their HIV prevalence in Chiang Mai and Bangkok.

Positive health interventions also include services to help persons living with HIV/AIDS (PLHA) to live healthy lives and to reduce transmission of HIV. Unique approaches target adult patients in general HIV care clinics, MSM, and perinatally HIV-infected youth. Through collaboration with Queen Sirikit National Institute of Child Health and Siriraj Hospital, a GAP-supported approach is in use to assess readiness and inform infected children of their HIV status. Many other countries have requested GAP/ARO assistance with this approach, and RTG staff have shared it at WHO meetings in Geneva to develop pediatric HIV disclosure guidelines.

Other prevention services target prisoners, HIV-infected mothers, and partners of PLHA. Using a curriculum designed by GAP/ARO staff, prison peer education, counseling, and STD services expanded to 19 provinces in 2009, with GFATM support. Having long been involved in Thailand's PMTCT successes, GAP/ARO staff serve as members of national HIV monitoring and evaluation working groups, helping to interpret data and design key indicators related to PMTCT and pediatric HIV care. Staff are members of a couples counseling working group and were responsible for initiating a pilot counseling program for discordant couples that was implemented at 17 hospitals in five provinces in 2009.

As part of health systems strengthening activities, GAP/ARO emphasizes support for **quality systems in laboratories**, and has helped establish external quality assessment schemes for HIV serology, CD4 cell testing, and viral load. Developed and expanded initially with GAP support, MOPH's external quality assessment (EQA) system for HIV serology now reaches approximately 1,000 laboratories across Thailand. Laboratories in Cambodia and Vietnam also receive TA on HIV viral load and CD4 EQA from GAP/ARO and MOPH experts in laboratory quality systems (see sidebar, next page, *GAP/ARO Exports Thai Laboratory Expertise*).

Through a regional center of the Department of Medical Sciences, GAP/ARO supports laboratory accreditation. To date, 14 laboratories have received national certification or have met the International Organization for Standardization standards (ISO 15189). An additional 44 hospital laboratories in four provinces are working toward those goals. In 2009, GAP developed a partnership with the Medical Technologist Council to promote and support national certification for all hospital laboratories.

GAP also concentrates on **care and treatment** for PLHA and their families. A pediatric treatment network, formalized with help from GAP/ARO, has expanded access in Thailand to antiretroviral drugs for HIV-infected children who live far from major populations centers. Training of community hospital staff and local volunteers allows children to receive care close to home. Through joint GAP and MOPH support, including the development of "how-to" manuals and training curricula, the model continues to spread, from three provinces in 2007 to 15 in 2009.

To build capacity for HIV care and treatment, GAP provided funding and TA to develop and pilot HIVQUAL-T, an initiative for performance measurement and quality improvement. Through a partnership with the National Health Security Office, nearly 90% of the country's public hospitals are now participating in

GAP/ARO Exports Thai Laboratory Expertise

What do Cambodia, Ethiopia, Laos, Papua New Guinea, Rwanda, South Africa, Uganda, and Vietnam have in common? Each of these countries receives HIV laboratory technical assistance (TA) from Thailand. Through dozens of separate visits, consults, trainings, discussions, and communications, the GAP Asia Regional Office (ARO) is helping to improve laboratory innovation, quality, and safety around the globe.

The TA comes in many forms, from direct consultation or training on laboratory quality management systems or accreditation, to indirect support via curricula or guidelines for countries that are ready to do their own training. Sometimes GAP/ARO locally employed staff provide TA directly; other times GAP/ARO supports TA by experts from its main partners, Thailand MOPH and Thai universities. "We go there to plant idea seeds," explains Somboon Nookhai, GAP/ARO's laboratory coordinator. "Then the countries grow their own experts, with the seeds we provide."

In 2009, GAP/ARO staff and MOPH shared their laboratory accreditation experience with counterparts in Rwanda and Uganda and taught HIV/TB identification in Johannesburg to laboratory technicians from eight Southern African countries. MOPH laboratory scientists, who have the benefit of day-to-day experience at the bench, taught workshops on CD4 testing, HIV serology, and identification of opportunistic infections in Cambodia and Vietnam. They also traveled to Ethiopia to provide training and consultation on laboratory EQA systems.

"It makes lots of sense for us to provide this kind of TA in this region and in Africa," says Orapin Suksripanich, GAP/ARO laboratory coordinator. "Coming from Thailand, we've faced many of the same problems."

GAP/ARO helped sponsor and staff a booth in central Bangkok on World AIDS Day. Thailand's HIV epidemic continues to be concentrated among its most-at-risk populations.

HIVQUAL-T. Quality of care indicators in participating hospitals have increased steadily, and new modules have been developed, including one for sexually transmitted disease (STD) clinic care. GAP/ARO staff have developed an international version of HIVQUAL software, and the HIVQUAL model and software have now been adapted for use in more than ten countries around the world.

GAP and MOPH also conducted a national PMTCT evaluation that identified gaps in some services, which led directly to program improvement. These evaluation results have implications for other countries where PMTCT clinical and program services transition to become integrated, sustainable programs.

Another GAP/ARO priority is assistance with new **surveillance methodologies**. To monitor the epidemic and provide information for program planning, state-of-the-art methods have been integrated into routine annual surveillance in Thailand, including laboratory testing using a new and inexpensive immunoassay (BED-CEIA), behavioral surveys using handheld and audio-enabled computers, and urine-based surveillance of sex workers' STDs. Results from these approaches have contributed to the national HIV prevention strategy.

GAP also strengthens surveillance related to antiretroviral resistance in Thailand. The program helped introduce venue-day-time sampling to survey MSM, building on earlier surveys by the CDC HIV/STD Research Program. GAP provides critical policy input related to the administration of GFATM grants to RTG. All of GAP/ARO's activities and accomplishments are in support of **human capacity building, health systems strengthening, and sustainability.**

Global Activities

The GAP-supported achievements in Thailand have produced expertise and models that are being used in other countries where the U.S. Government is working with host governments to fight the HIV epidemic. Thailand's early success with a national PMTCT monitoring system, developed collaboratively with GAP/Thailand, became the basis for development of a generic PMTCT monitoring system

by CDC and WHO, a tool kit that is now available to all countries. As described above, the HIVQUAL software is being shared with several countries—Cambodia, Ethiopia, Haiti, India, Mozambique, Namibia, Nigeria, PNG, Uganda, and Vietnam.

Helping to adapt model programs such as laboratory quality systems, HIV disclosure for HIV-infected children, and injecting drug users (IDU) peer outreach, has become an increasingly large part of GAP/ARO's portfolio of activities. In addition to its work in Laos and PNG, the program has provided TA to programs in Cambodia, Ethiopia, Tanzania, Timor-Leste, Uganda, and Vietnam. TA providers to other countries include not only GAP staff, but also Thai government and other partner experts.

Providing TA outside the country serves both Thailand and the countries receiving this assistance. As Thailand becomes a donor assistance country in its own right, GAP/ARO is playing a role in mentoring Thai government and locally employed GAP staff, with a goal of promoting south-to-south collaboration, and encouraging information sharing between all countries, regardless of region.

During 2009 in **Laos**, in close partnership with WHO, GAP/ARO provided TA to the Lao Ministry of Health's Center for HIV/AIDS and STD in order to advance implementation of the Lao National HIV/AIDS Plan. Support focused on HIV care and treatment services, laboratory quality systems, capacity building for surveillance and data use, and HIV prevention among MSM. These activities build on and complement existing USAID-supported NGO efforts in Laos. GAP/ARO will continue to work in close partnership with WHO on surveillance and laboratory services.

During 2009 in Papua New Guinea (PNG), GAP/ARO worked side by side with WHO to provide technical assistance to the PNG National Department of Health's HIV program.

During 2009 in **PNG**, GAP/ARO worked side by side with WHO to provide TA to the PNG National Department of Health's HIV program. As with Laos, areas of support were selected to complement existing USAID-supported NGO efforts in PNG. Initial areas of support included quality systems for HIV care and treatment, laboratory quality systems, HIV counseling and testing guidelines and procedures, and surveillance quality assurance.

Plans for FY 2010

During 2010, GAP/ARO will begin development of a formal technical assistance partnership framework between the U.S. government and RTG. This compact will outline goals for the U.S.-Thai collaboration on HIV programs over the next five years, and will establish a plan and benchmarks toward reaching these goals. Also in 2010, GAP/ARO will further implementation of technical support programs for Laos and PNG, and continue expanding its TA to other countries, using models that were developed collaboratively between GAP and MOPH.

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HIV/STD Research Program

The partnership between CDC's Division of HIV/AIDS Prevention (DHAP) and Thailand MOPH began in 1990 with the establishment of the HIV/AIDS Collaboration (HAC) in Bangkok. In 1991, HAC opened a field station in Chiang Rai, a high HIV prevalence area, to determine risk factors for transmission of HIV and other STD among female sex workers. HAC also began collaborating with the Bangkok Metropolitan Administration (BMA) to better understand the spread of HIV among injecting drug users (IDU) in Thailand's capital city. In 1992, HAC began a series of studies with Siriraj and Rajavithi Hospitals on the prevention of mother-to-child HIV transmission and improvements in the care of HIV-infected women and their children. In 1998, a behavioral research section was added to the Collaboration to study health behaviors in high-risk groups like adolescents, IDUs, and men who have sex with men (MSM).

HIV research activities have focused on preventing mother-to-child transmission, assessing the safety and acceptability of vaginal microbicides, and evaluating the capability of vaccines and antiretroviral medicines to prevent infection.

About HSRP

Established 1990

In-country Staff
3 CDC direct hires
35 locally employed staff
1 contractor

Robert Linkins, PhD, MPH,
Director (through July 2009)
Michael Martin, MD, MPH,
Acting Director and HIV Clinical Research Section Chief (August – December 2009)

Purpose
To conduct research on HIV trends, risk behaviors, and prevention tools like vaccines and pre-exposure prophylaxis

FY 2009 Program Budget
$5.6 Million

HSRP's Lab Section was the first in the world to describe HIV re-infection with different strains.

Major Partners

The HIV/STD Research Program (HSRP) has a long record of collaboration with MOPH, BMA, and institutions such as Mahidol University, Queen Sirikit National Institute of Child Health, and Siriraj, Rajavithi, and Chiang Rai Regional Hospitals. HSRP also partners with local nongovernmental organizations including the Thai Red Cross Society and Rainbow Sky, and other CDC programs in Thailand such as the Global AIDS Program (GAP). An important part of the mission is capacity building, which HSRP accomplishes through close partnerships in Thailand and in neighboring countries in Southeast Asia.

Accomplishments

HSRP's work has impacted the HIV epidemic in Thailand and around the world.

The HIV Clinical Research Section of HSRP helped conduct and evaluate Asia's first phase III HIV vaccine trial, the AIDSVAX B/E HIV vaccine trial. Although the vaccine did not protect IDUs from infection, this trial helped build capacity, developed an effective HIV risk reduction package, and demonstrated the feasibility of conducting phase III HIV prevention trials among IDUs in Thailand.

The Behavioral Research Section showed that handheld computer-assisted self interviewing could collect high-quality, sensitive data. This tool is now used for risk behavior surveillance by MOPH. This section led Thailand's first systematic assessment of HIV prevalence and risk behaviors in MSM, and uncovered a previously unknown epidemic of HIV infection in this risk group.

In addition to its ongoing support of HSRP's research studies, the HIV/STD Laboratory Sciences Section described human genetic variations associated with HIV resistance in female sex workers, and was the first in the world to describe HIV re-infection with different strains (also called "super-infection"). It evaluated inexpensive methods to determine CD4 counts using specimens other than blood to determine the presence of HIV and viral load, and developed advanced methods to identify STD infection in the presence of microbicidal and other gel products.

In more than 15 years of ground-breaking HIV prevention research, HSRP has adjusted its priorities to reflect the changing face of the HIV epidemic in Thailand, where heterosexual and mother-to-child transmission are largely controlled while IDUs and MSM remain at high risk of infection.

Current Activities

HSRP's current activities focus on oral chemoprophylaxis in IDUs and prevention efforts in MSM, and completing work on topical microbicides and the prevention of mother-to child transmission and HIV treatment.

The Bangkok Tenofovir Study is a phase II/III randomized, placebo-controlled study being conducted in 17 Bangkok drug treatment clinics to determine if a daily dose of oral tenofovir (an antiretroviral drug widely used for *treatment* of HIV infection) is safe and can *prevent* HIV infection in IDUs. Approximately 2,400 eligible IDUs are being randomized to receive either tenofovir or placebo. Participants choose to follow up with daily directly observed taking of study drug, or monthly without direct observation. Interim safety and efficacy analyses are conducted by an independent data and safety monitoring board (DSMB).

Close collaboration with IDUs and IDU community representatives enabled trial enrollment to begin in June 2005. Rates of adherence to daily tenofovir or placebo have been good, and daily observed treatment has been successfully implemented. The DSMB advised that the trial continue following safety reviews in 2006, 2007, 2008, and 2009. Final trial results are expected in 2010.

Supaporn Chaikummao

Supaporn Chaikummao

A rising trend in HIV cases among men who have sex with men (MSM) in Thailand has a number of doctors, nongovernmental organizations, and observers worried. Among them is Ms. Supaporn Chaikummao, clinic manager at the Silom Community Clinic, which integrates research and services for MSM.

While great strides in combating HIV/AIDS have been made, estimates for number of HIV cases in MSM rose from 17% to 31% between 2003 and 2007. "We have learned from our study that HIV is still a big problem in MSM, unlike in most of the rest of the Thai population," says Supaporn.

A rise in HIV cases in the MSM population in Thailand could easily have a spillover effect on the rest of the Thai population. Today, MSM are second only to injection drug users as the group with the highest HIV prevalence in Thailand. Nonetheless, awareness of HIV status and prevention knowledge among MSM in Thailand remains low.

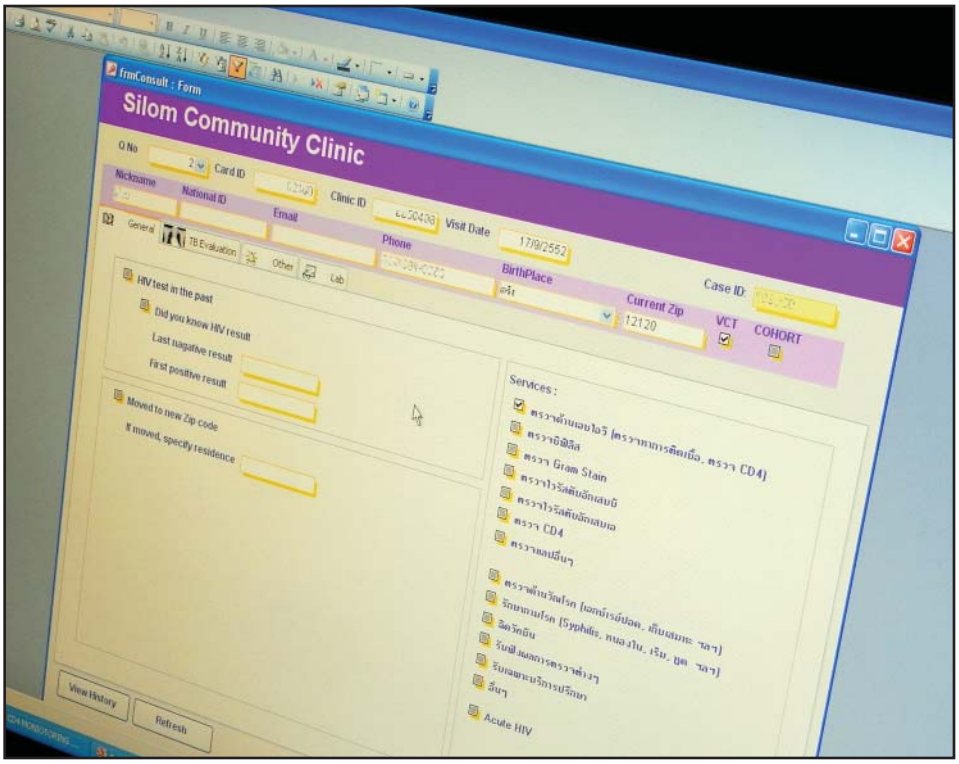
This is why Supaporn and her colleagues at the Silom Community Clinic work day and night with MSM to prevent HIV infection, as well as with the community to help prevent stigmatization and discrimination. Having earned degrees in nursing and public health administration, "Pii Moo," as many of her colleagues call her, has worked with health agencies at the U.S. Mission to Thailand for many years.

Supaporn helped open the clinic in 2005 with the goal of providing two key services: HIV voluntary counseling and testing, and clinical research to prevent HIV infection. Set up to develop a model that others in Thailand and around the world could replicate, the clinic receives numerous Thai and foreign visitors interested in learning how to provide health services for special groups.

In 2003, HSRP began surveillance of HIV prevalence among Bangkok MSM. Surveillance was expanded in 2005 and 2007 to include Chiang Mai and Phuket, as well as male sex workers and transgender persons. In Bangkok, the prevalence of HIV infection among MSM increased from 17% to 31% from 2003 to 2007. Based on this increase in HIV prevalence and with support from the MSM community, HSRP collaborated with stakeholders to develop plans to establish an MSM cohort.

The Bangkok MSM Cohort Study, conducted by HSRP in collaboration with community advocacy groups, is following 1,300 MSM in Bangkok for three years. It is studying the prevalence, incidence, and risk factors for HIV and other STDs, as well as follow-up rates and willingness to participate in biomedical trials. After 12 months of follow-up, over 80% remain in the study. High HIV risk has been observed in this population, including a baseline HIV prevalence of 22% and an HIV incidence of over 5% per year. HSRP is now preparing for HIV prevention trials in this group.

HSRP has completed a safety trial of UC-781, a non-nucleoside reverse transcriptase inhibitor (NNRTI), in low-risk couples, the fifth such HSRP microbicide study. This phase I, randomized, placebo-controlled, double-blind study will continue the clinical development pathway for UC-781 and provide additional safety and acceptability data from a 14-day, twice-daily application using 0.1% and 0.25% concentrations in 45 sexually active, HIV-uninfected women and their HIV-uninfected partners. Final study results are expected in 2010.



The Bangkok MSM Cohort Study, conducted by HSRP in collaboration with community advocacy groups, is following 1,300 MSM in Bangkok for three years.

The NNRTI Response Study is a prospective, multi-country observational study being conducted jointly by HSRP and GAP. Its purpose is to assess the effectiveness of nevirapine or other NNRTI-based highly active antiretroviral therapy in HIV-infected women who are initiating treatment after previously being given single-dose nevirapine for the prevention of mother-to-child HIV transmission in pregnancy, as compared with women who have not received single-dose nevirapine. Enrollment of Thailand's 217 HIV-infected women at Siriraj and Rajavithi Hospitals was completed in January 2007, and data analysis is ongoing.

The HIV/STD laboratory performs tests for the studies conducted by HSRP. It is also evaluating the implementation of rapid oral fluid testing for HIV in 18 Bangkok clinics, developing methods to detect STD and occult HIV infection, and is using powerful new molecular techniques to determine characteristics of the HIV strains in HRSP studies including the prevalence of drug resistance, and of dual and recombinant infections.

The laboratory's permanent home has just been completely renovated to provide staff with a safer work environment. The lab staff are now preparing for certification by the College of American Pathologists and the international lab standard ISO-15189.

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Immigrant, Refugee, and Migrant Health

The Immigrant, Refugee, and Migrant Health Program (IRMHP) for Southeast Asia is one of two field regional programs established overseas by the CDC Division of Global Migration and Quarantine (DGMQ). The program aims to reduce morbidity and mortality due to infectious diseases among immigrants, refugees, international travelers, and other mobile populations that cross international borders. In addition, DGMQ is committed to promoting border health and preventing the introduction of infectious agents into the United States. DGMQ has statutory authority to make and enforce regulations necessary to prevent importation of disease. Responsibilities under this authority include oversight of the content and quality of medical screening of U.S.-bound immigrants and refugees prior to arrival, and implementation of appropriate public health activities during refugee health and mass migration emergencies. In recent years, approximately 450,000 immigrants and 70,000 refugees per year have been legally admitted into the United States. Most of the immigrants come from Asia and the Americas; approximately 70% of refugees arrive from Asia.

About IRMH

Established 2006

In-country Staff
1 CDC direct hire
2 locally employed staff

Luis Ortega, MD, MPH, Director

Purpose
To improve immigrant, refugee, and migrant health, while supporting U.S. resettlement of refugees in Thailand and the region

FY 2009 Program Budget
$ 860,000

Major Partners

IRMHP collaborates with various agencies to accomplish its mission, including the International Organization for Migration (IOM), Aide Médicale Internationale, International Rescue Committee, Ameri-

At refugee camps throughout the region, IRMHP provides technical and infrastructural assistance to organizations responsible for the health of refugee populations.

▲ Refugee camps along the Thailand-Burma border.

can Refugee Committee, Médecins Sans Frontières, the Shoklo Malaria Research Unit (SMRU), the United Nations High Commissioner for Refugees, and WHO. The IRMHP liaises with the U.S. Department of State's Bureau of Population, Refugees, and Migration and the Bureau of Consular Affairs on matters related to the required medical examination for refugee resettlement and immigrant visa application.

As a participating program in the Thailand MOPH – U.S. CDC Collaboration (TUC), the IRMHP has established linkages with the Thailand MOPH Bureau of Policy and Strategy and Bureau of Epidemiology for cooperation on migrant and border health.

Recent Accomplishments

The program provided technical consultation to IOM on the medical examination of refugees processed for the regional U.S. Refugee Admissions Program. From Thailand and Malaysia to the U.S. in 2009, the number of refugee departures totaled approximately 18,000. The process was improved by the establishment, with IRMHP support, of state-of-the-art laboratory capacity for tuberculosis diagnosis.

IRMHP also provided technical and infrastructure assistance, including laboratory support from GDD-Thailand, to camp-based health organizations responsible for the primary health care of the refugee populations. This included epidemiologic support for a measles outbreak, establishment of a stockpile of medical supplies to prepare for any outbreaks of pandemic influenza, training of health care workers in disease outbreak investigation and response, and renovation of tuberculosis treatment facilities. Detection of the first laboratory-confirmed case of H1N1 in a refugee camp was the direct result of DGMQ's support to SMRU expanding its laboratory testing capacity.

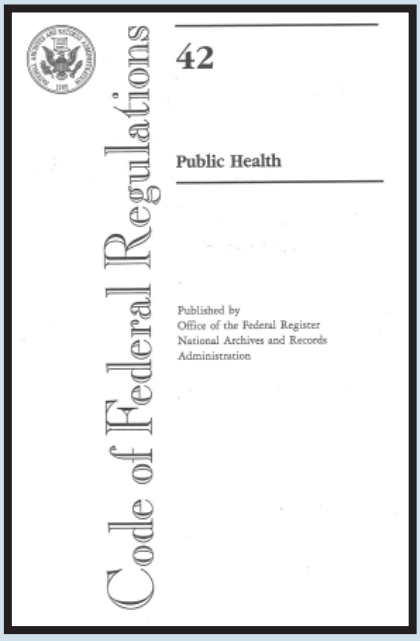
In collaboration with multiple health organizations, the program completed a field investigation to identify potential

End to HIV Restrictions for U.S. Immigration

On November 2, 2009, the Department of Health and Human Services (HHS), which includes CDC, published a final rule removing HIV infection from the list of diseases in the Code of Federal Regulations, Title 42 (Public Health) that can keep people who are not U.S. citizens from entering the United States.

Division of Global Migration and Quarantine (DGMQ) staff were instrumental in writing, clearing, and moving forward the final rule, which is effective January 4, 2010. Testing for HIV is no longer required as part of the U.S. immigration medical screening process, and people with HIV infection no longer require a waiver from the U.S. Department of Homeland Security to obtain an American visa.

HHS has authority to promulgate regulations that establish requirements for the medical examination of immigrants, refugees, asylum seekers, and parolees before they may be admitted into the United States. DGMQ administers the regulations, which include the health-related conditions that make non-U.S. citizens ineligible for entry into the United States. More information about this final rule is available at:
http://www.cdc.gov/ncidod/dq



sources of lead exposure after elevated blood lead levels were reported among resettled Burmese refugee children. The investigation's main recommendation was to target lead poisoning prevention efforts to children under the age of two years to protect them from serious damaging health effects. (See sidebar, page 25, *Blood Lead Levels in Refugee Children*.)

In collaboration with the Immigrant Visa Unit of the Consulate General of the U.S. in Guangzhou, China, IRMHP fully implemented the use of the 2007 Technical Instructions for Tuberculosis Screening and Treatment (TBTIs) for immigrant visa applicants. The importance of this accomplishment is that China usually ranks as the third-largest source country for U.S.-bound immigrants, with approximately 30,000 immigrant visa entrants annually arriving in the U.S. China also has a very high burden of tuberculosis.

IRMHP provided consultation to an external evaluation panel that conducted a technical review of the tuberculosis screening and treatment program for U.S.-bound Bhutanese refugees living in seven camps in Nepal. This screening program has successfully resettled over 20,000 refugees in the last two years.

DGMQ hosted the sixth annual Intergovernmental Immigrant and Refugee Health Working Group in Bangkok in 2009. Health and immigration representatives from Australia, Canada, New Zealand, the United Kingdom, and the U.S. developed joint plans to collaborate on continued improvements in the areas of immigration and refugee health.

IRMHP supports surveillance systems for infectious diseases among U.S.-bound refugees from camps such as Mae La in northern Thailand.

Plans for FY 2010

- Continue to develop and maintain surveillance systems for infectious diseases, including pandemic influenza, among U.S.-bound immigrant and refugee populations in the region.
- Facilitate epidemiologic investigations and support implementation of effective public health interventions related to health issues for U.S.-bound immigrant and refugee populations in the region.
- Respond to refugee resettlement emergencies, including the provision of technical assistance for the diagnosis, management, and control of infectious diseases to prevent their spread to other populations.
- Continue to support the implementation of the 2007 TBTIs for immigrant visa applicants in other countries of the region, such as Cambodia, India, Laos, and Nepal.
- Assist partners in developing all-hazards preparedness plans, and support preparedness and response training activities.
- Continue to develop and strengthen border and migrant health partnerships.

Blood Lead Levels in Refugee Children

Data from six U.S. states where refugees are resettled showed elevated blood lead levels in 13% of Burmese children—eight times the U.S. prevalence.

CDC's Division of Global Migration and Quarantine and the National Center for Environmental Health worked with local health authorities and nongovernmental organizations at the Thai-Burma border to screen 645 U.S.-bound refugee children during May and June of 2009. Elevated blood lead levels were identified in 5% of them. Several potential exposure sources were identified, including car batteries used as supplemental sources of household electricity in the refugee camps, traditional remedies, and some cosmetics and spices imported from Burma.

Efforts are currently underway to eliminate exposure to these sources of lead in the camps and surrounding environment along the Burma-Thailand border.

(See related story on page 5)

In 2009, the annual Intergovernmental Immigrant and Refugee Health Working Group meeting took place in Bangkok. CDC's Dr. Tarissa Mitchell presented findings from a study of blood lead levels in U.S.-bound refugee children.

IRMH 2009 Publications

1. Cano MV, Naughton MP, Ortega LS. **Before arrival in the United States: panel physicians and the overseas medical examination.** In: Centers for Disease Control and Prevention. *CDC health information for international travel 2010 (Yellow Book)*. Atlanta: U.S. Department of Health and Human Services, Public Health Service, 2009.
2. Liu Y, Weinberg MS, Ortega LS, Painter JA, Maloney SA. **Overseas screening for tuberculosis in U.S.-bound immigrants and refugees.** *N Engl J Med* 2009;360(23):2406-15.

International Emerging Infections Program

CDC's first International Emerging Infections Program (IEIP) was established in Thailand in 2001. Developed as a collaboration between the U.S. CDC and the Thailand MOPH, and designed to address emerging infectious disease threats, its work centers on strengthening detection, description, control, and prevention of infectious diseases of national and international importance. Since its inception, IEIP has worked with MOPH to combat emerging and re-emerging infectious diseases through several core strategies: surveillance (disease detection); research and evidence-based public health; outbreak response and preparedness; and training and capacity-building.

Key IEIP activities include 1) implementing an active, population-based surveillance system for pneumonia, to increase understanding of the etiology and burden of pneumonia in Thailand and guide public health policy and decision-making; 2) supporting nationwide sentinel surveillance systems for human influenza and other infectious diseases in Thailand; 3) undertaking epidemiologic research to improve detection, understanding, and control of important and emerging infectious diseases, such as evaluation of new diagnostic tools and public health interventions; 4) supporting investigations and responses to infectious disease outbreaks and public health emergencies, including SARS, avian influenza, anthrax, cholera, multiple zoonotic diseases, and most recently, 2009 pandemic influenza H1N1 virus; and 5) training of Thai, regional, and U.S. scientists in surveillance and epidemiology, laboratory diagnostics and methods, infection control, and emergency response and preparedness through intensive mentorship programs and workshops. IEIP-Thailand also actively engages public health partners to build alliances, harmonize strategies, and leverage resources to meet current and future infectious disease challenges.

Beginning in 2004, IEIP-Thailand became part of two larger networks consisting of IEIP programs and Global Disease Detection (GDD) Regional Centers located around the world. These networks are committed to supporting scientific excellence and building regional and global capacity to detect and contain emerging infectious diseases, using the new International Health Regulations (WHO, 2005) as an organizing framework. IEIP's strong national collaborations are therefore now complemented by a network of regional and global partners, all working together to reduce emerging infectious disease threats.

About IEIP

Established 2002

In-country Staff
5 CDC direct hires
35 locally employed staff
3 contractors
71 local contractors

Susan Maloney, MD, MHS, Director

Purpose
To combat emerging and re-emerging infectious diseases by strengthening detection, description, control, and prevention of infectious diseases of national and international importance

FY 2010 Program Budget
$4 Million (core)
$6 Million (GDD, influenza, other sources)

IEIP collaborated with MOPH, WHO, and other partners in responding to the H1N1 pandemic.

Major Partners

IEIP has a strong history of collaboration with the Royal Thai Government at many levels. The program partners with the MOPH Department of Disease Control, the Bureau of Epidemiology, the Thailand Field Epidemiology Training Program (FETP), the National Institute of Health, the Bureau of Emerging Infectious Diseases, the Bamrasnaradura Institute for Infectious Diseases, the Sa Kaeo and Nakhon Phanom Provincial Health Offices, and the Ministry of Agriculture and Cooperatives and its Department of Livestock Development. Additional local partners include the Queen Sirikit National Institute of Child Health, the Influenza Foundation of Thailand, Mahidol University, and several other universities and academic institutions in Thailand.

In the CDC Southeast Asia Regional Office, IEIP has collaborative working relationships with several other overseas programs, including the Immigrant, Refugee, and Migrant Health Program, the regional TB Program, and the regional advisor to the national and international FETPs.

IEIP works closely with the WHO Thailand Office, and with WHO-SEARO and WHO-WPRO regional offices, partnering together on numerous collaborative projects to support IHR implementation and to build national and regional public health capacity. This work is part of the GDD Strategy, and forms one the core programs underpinning the GDD Regional Center in Thailand.

IEIP-Thailand also networks with IEIP sites in other countries and with regional partners on projects to detect and respond to global emerging infectious disease threats. IEIP collaborates closely with CDC counterparts in the region involved in avian and pandemic influenza surveillance, preparedness, and response.

Collaborations continue to expand with U.S. government agencies in Thailand and the region, such as the Armed Forces Research Institute of Medical Sciences (AFRIMS) and USAID; U.S.-based institutions, such as the National Institutes of Health and the Department of Defense; and the Mahidol-Oxford Research Unit.

Recent Accomplishments

Much of the year 2009 saw IEIP's resources and activities focused on pandemic H1N1 influenza. The pandemic arrived earlier in Thailand than in most other countries in Southeast Asia, and circulated at the time of year normally associated with seasonal influenza. IEIP supported Thailand MOPH in investigating and monitoring the introduction and

Enhanced Surveillance

IEIP and MOPH are leveraging their pneumonia surveillance sites in two rural provinces to help characterize the novel H1N1 infection among hospitalized pneumonia patients. More epidemiologic and clinical information is needed, especially from locations where the pandemic virus is striking during the typical seasonal influenza season.

The sites will also use real-time PCR to detect and subtype influenza infections. Such enhanced diagnostic capability is unique for provincial hospital laboratories outside of national and regional medical centers in Thailand. Clinicians will receive real-time results to guide patient care, while rapid case identification will allow collection of additional clinical and risk factor information from patients before discharge.

Data from the population-based surveillance sites will also be used to describe disease burden in these provinces and to extrapolate estimates for all of Thailand. The IEIP-MOPH collaborative project on severe and fatal pneumonia focuses on identifying markers for severe disease and death.

Pathogens in Bats

To better understand the potential human threat of pathogens that infect bats, in August 2009, an investigation team composed of epidemiologists and veterinary disease specialists from IEIP-Thailand, AFRIMS, CDC headquarters in Atlanta, and the Thai Red Cross Society fanned out across Thailand to collect samples of bat saliva, internal organs, and blood. These scientists traveled to six Thai provinces, selecting caves, temples, and fruit gardens to sample bats that dwell in close proximity to human populations.

Approximately 263 bats, representing seven species, were collected. Positions were mapped using GPS. The team also interviewed more than 150 local people, such as guano collectors and national park workers, about their knowledge of bat-borne diseases and their risk perceptions and behaviors. Data analysis and laboratory testing for pathogens are now in progress in Thailand and the U.S

As part of the One Health Initiative, IEIP/GDD-Thailand scientists are investigating bats as a potential reservoir for human pathogens.

spread of pandemic H1N1, and provided technical consultation in implementing appropriate strategies for control of the pandemic. IEIP also provided assistance for confirming the first H1N1 case identified in Thailand, procuring essential laboratory diagnostic tests and reagents, and facilitating specimen handling and shipping.

In the area of **early disease detection and control,** IEIP continued active, population-based surveillance in two provinces for hospitalized pneumonia. Its novel integrated surveillance model continues to build epidemiologic and laboratory capacity for respiratory disease monitoring and to guide public health policy (see sidebar, previous page, *Enhanced Surveillance*). This year, IEIP surveillance sites helped identify and monitor pandemic H1N1 infections among hospitalized pneumonia patients, and data gathered has been used to describe disease burden and to extrapolate estimates to all of Thailand.

IEIP and the MOPH Bureau of Epidemiology recently launched a unique surveillance system for severe and fatal pneumonias, designed to strengthen investigation and improve understanding of causes of severe and fatal pneumonia. The system is also envisioned to serve as an early detection system for emerging respiratory diseases in Thailand. The first phase of the project created notification, investigation, and management guidelines and started a network of regional sentinel surveillance centers. The project will eventually support and link clinical, bacteriological, pathological, epidemiological, and knowledge management networks for pneumonia surveillance throughout Thailand. During the 2009 H1N1 pandemic, this fledgling network was able to investigate deaths attributed to H1N1. The data collected have contributed to understanding of the pathophysiology of H1N1 and informed policy changes in clinical management of H1N1 cases in Thailand.

IEIP and its Influenza Section continued to support Thailand's sentinel surveillance network for human influenza, operated by the Thailand National Influenza Center (NIC) of the Thailand NIH. The NIC operates 10 sentinel influenza surveillance hospitals throughout the five regions of Thailand and the Bangkok metropolitan area, and has recently integrated an additional eight sites as part

of its efforts to enhance the country's influenza surveillance program. During the last five years, the NIC has expanded this virological surveillance system so that it is now capable of monitoring circulating influenza strains, detecting new variants, and testing drug resistant strains.

IEIP expanded its work in the area of **zoonotic diseases** in 2009. Together with AFRIMS, IEIP sponsored a scientific conference on zoonotic and vector-borne diseases. Over 160 scientists from Thailand and the Asia-Pacific region shared scientific information about emerging zoonotic and vector-borne diseases that pose threats to the region, including dengue, malaria, chikungunya, Nipah virus, brucellosis, *Streptococcus suis* and influenza. Participants also discussed ways to foster research and programmatic collaborations.

IEIP continued its support to "One World, One Health" approaches, which take into account the important interrelationships among human, animal, and environmental health. In the northern Thai province of Lampang, researchers monitored *Streptococcus suis* infections in both pigs and humans. Any outbreaks of the disease will be investigated jointly by the public health and livestock offices in Lampang. In collaboration with national partners and U.S. CDC headquarters, IEIP also recently embarked on an epidemiologic research project to investigate the role of bats as reservoirs for emerging infectious diseases in human populations (see sidebar, previous page, *Pathogens in Bats*).

The program also maintained its **research and evidence-based public health efforts** on respiratory diseases (such as pneumonia, human influenza, and tuberculosis), febrile illness, encephalitis, zoonotic and vector-borne diseases, and other emerging pathogens. The IEIP Influenza Section collaborated with the Thailand MOPH and the Influenza Foundation of Thailand to host the 2nd Thailand National Influenza Research meeting in October 2009. More than 130 scientists attended oral presentations and poster sessions on clinical management, epidemiology, social and economic impact, infection control and non-pharmaceutical interventions, influenza vaccine, and the virology and immunology of influenza. The meeting provided a unique opportunity for Thai researchers to review published literature on human influenza, to communicate preliminary findings on ongoing research, and to share clinical and epidemiologic data on the H1N1 pandemic (see sidebar, right, *HITS and H1N1*). It also served as a networking forum for influenza researchers and has encouraged future research in Thailand, to improve its capacity to prevent and control seasonal and pandemic influenza.

IEIP moved forward on a study to determine the frequency of *Bartonella* and other novel pathogens as causes of endocarditis, a potentially fatal infection of the heart, in collaboration with Khon Kaen University and the CDC's National Center for Zoonotic, Vector-Borne, and Enteric Diseases. The study will investigate epidemiologic and ecologic risk factors and causes of endocarditis, and will investigate the prevalence of *Bartonella* in animals in and near the homes of case patients.

Support for **laboratory diagnostics capacity and infrastructure development** was again a major IEIP focus in FY 2009. Its ongoing laboratory renovation project is nearing completion. The new facilities on the MOPH campus, to be shared with MOPH and other programs in the CDC Southeast Asia Regional Office, will provide state of the art facilities for laboratory testing, technology transfer, and training, and will ensure a safe and secure work environment.

Stepped-up laboratory efforts in the wake of the H1N1 pandemic have also provided critical support and information to the Southeast Asia region, enabling clinicians and public health officials to make informed decisions about management, response, and control. IEIP/GDD, along with the CDC Influenza Division, WHO, and staff from the National Influenza Center of Thailand have extended

HITS and H1N1

The multi-year Household Influenza Transmission Study (HITS), conducted in collaboration with Queen Sirikit National Institute of Child Health and AFRIMS, identifies children with influenza and prospectively follows all household members to determine secondary infection rates and to examine the potential protective effects of hand washing and face mask use in households with a confirmed influenza case.

The work took on special importance with the emergence of the H1N1 pandemic. HITS data allowed a comparison of the new influenza's secondary attack rate with that of seasonal flu, and helped inform pandemic control measures. The HITS study has also been able to assess the sensitivity of rapid point of care testing to detect the pandemic H1N1 virus, which is important because early diagnosis increases the benefits of antiviral treatment.

Thai IBIS-Plus

IEIP is partnering with the MOPH, and hospital and academic institutions, to support a novel surveillance network for invasive bacterial infections. The Thailand Invasive Bacterial Infection Surveillance (IBIS) began as a sentinel site surveillance system in 2005 but required additional resources to achieve its public health goals. Through partnership with IEIP, IBIS will now employ more active case ascertainment and data auditing; increased integration of clinical, epidemiologic, and laboratory data; and regular reporting to stakeholders. Additionally, two population-based sites will be added to the system to allow more robust disease burden calculations. This enhanced surveillance system will be called Thai IBIS-Plus. The primary objectives of Thai IBIS-Plus are to:

1. Monitor trends in diseases caused by selected pathogens of public health importance.
2. Demonstrate a scalable surveillance model could feasibly be adopted at a wider level in Thailand.
3. Provide a platform for documenting impact of public health interventions.

Thai IBIS-Plus currently includes over 30 sentinel sites. Current pathogens under surveillance include *Streptococcus pneumoniae, Haemophilus influenzae, Neisseria meningitidis, Streptococcus suis*, non-typhoidal Salmonella, and *Burkholderia pseudomallei*. Expansion to new sites and to new pathogens (including non-bacterial pathogens) is anticipated in the future.

IEIP scientists collect soil samples to evaluate the environment as a reservoir for unusual types of Legionella, which have been detected as a cause of hospitalized pneumonia through IEIP's surveillance and research activities.

support throughout the region to help develop diagnostic capacity and expertise, including PCR. Extensive logistical support and technical expertise provided by IEIP to national laboratories in Cambodia, Laos, and Vietnam enabled detection and identification of the new influenza strain in those countries.

IEIP also continued to collaborate with MOPH and WHO in **investigating national and regional disease outbreaks**. During 2009, IEIP supported outbreak investigation and response activities for chikungunya, measles, meningitis, cholera, tuberculosis, brucellosis, anthrax, and pandemic H1N1. In late summer 2009, IEIP was invited by the WHO Thailand Office to support and collaborate in a joint MOPH-WHO evaluation of Thailand's response and control strategies during the H1N1 pandemic. IEIP provided technical assistance and staff to each of the seven response evaluation teams, who reviewed the strengths and weaknesses of Thailand's response in such areas as surveillance, clinical management, control and prevention, risk communications, logistics, and vulnerable populations. The evaluations and recommendations of the teams will be shared with the highest levels of government and used to guide future pandemic policies and resource allocation.

IEIP's strong emphasis on **training and capacity building** included sponsorship of an advanced laboratory and epidemiology training course known as Global Salm-Surv. The WHO program builds capacity to detect, control, and prevent foodborne and other enteric infections. The five-day diagnostics training in Bangkok attracted 70 microbiologists and epidemiologists from 14 Asian countries. Participants learned about the use of molecular data for outbreak detection and response, were trained in salmonella subtyping, and received antisera kits, produced by the WHO National Salmonella and Shigella Centre in Thailand and funded by GDD.

IEIP continued working with MOPH and the Influenza Foundation to provide a training curriculum on diagnosis and clinical management of influenza to Thai

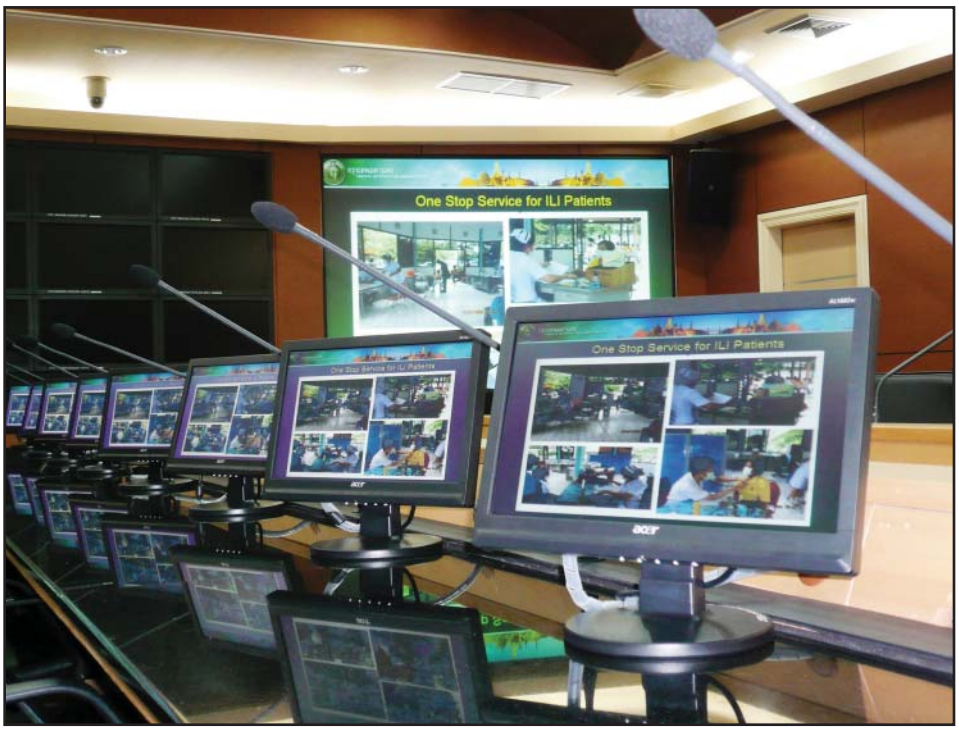
health care workers throughout the country. The program also supports numerous intensive mentoring and training opportunities for Thai and U.S. scientists in epidemiologic and laboratory sciences.

In 2009, IEIP/GDD collaborated with MOPH, WHO-SEARO, WHO-WPRO, and the REDI Centre in Singapore to develop a comprehensive training curriculum for respiratory infection control and prevention. The training incorporates the latest WHO and CDC infection control guidelines for influenza, acute respiratory infection, and TB, and includes adult learning techniques and numerous active skill-building components. This curriculum has already been implemented in regional train-the-trainer workshops in Thailand (11 countries, 80 participants), and India (7 countries, 75 participants) and has been translated into Thai and Chinese for local training initiatives.

IEIP concentrated on **building national and regional networks** to harmonize and integrate surveillance and response efforts. The program has just launched a collaborative project to support and enhance Thailand's national surveillance system of invasive bacterial infections (IBIS), called IBIS-Plus (see sidebar, previous page, *Thai IBIS-Plus*). IEIP has also recently embarked on a regional laboratory network and capacity-building initiative, in collaboration with GDD and WHO-SEARO. This initiative will focus on developing a harmonized laboratory diagnostics network, with assured quality control and biosafety components. Collaborative projects and protocols have also been developed with IEIP and GDD networks in other countries and regions.

Plans for FY 2010

- Continue and expand activities to address public health surveillance and research priorities, focused on assessing disease burden, improving diagnosis and management, and evaluating the impact of disease control interventions (including vaccination programs), and facilitate use of these data to guide public policy decisions, particularly in relation to pneumonia and influenza.
- Demonstrate innovative surveillance, control, and prevention strategies to enhance early detection and response to emerging infectious disease threats, with emphasis on zoonotic and vector-borne diseases, bacterial and enteric diseases, and other specific diseases of national and regional importance.
- Develop joint training opportunities to strengthen infectious disease surveillance and response capacity, including epidemiology and laboratory sciences and hospital infection control.
- Support outbreak response activities, and collaborate with national and regional partners to improve emergency response and preparedness in Thailand and the Asia-Pacific region.
- Promote collaborations and harmonizing of strategies among partners, both national and regional, including through the IEIP and GDD global networks.



IEIP continues to support outbreak response activities, in collaboration with Thailand MOPH, the GDD network, and WHO.

1. Baggett HC, Graham S, Kozarsky PE, Gallagher N, Blumensaadt S, Bateman J, Edelson PJ, Arguin PM, Steele S, Russell M, Reed C. **Pretravel health preparation among US residents traveling to India to VFRs: importance of ethnicity in defining VFRs.** *Travel Med* 2009;16(2):112-8.
2. Baggett HC, Peruski LF, Olsen SJ, Thamthitiwat S, Rhodes J, Dejsirilert S, Wongjindanon W, Dowell SF, Fischer JE, Areerat P, Sornkij D, Jorakate P, Kaewpan A, Prapasiri P, Naorat S, Sangsuk L, Eampokalap B, Moore MR, Carvalho G, Beall B, Ungchusak K, Maloney SA. **Incidence of pneumococcal bacteremia requiring hospitalization in rural Thailand.** *Clin Infect Dis* 2009;48 Suppl 2:S65-74.
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5. Hanshaoworakul W, Simmerman JM, Narueponjirakul U, Sanasuttipun W, Shinde V, Kaewchana S, Areechokechai D, Levy J, Ungchusak K. **Severe human influenza infections in Thailand: oseltamivir treatment and risk factors for fatal outcome.** *PLoS One* 2009;4(6):e6051.
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7. Khetsuriani N, Tong S, Lu X, Reed S, Erdman D, Campbell A, Supawat K, Liamsuwan S, Jothikumar N, Olsen S. **Systemic infection with enteric adenovirus in immunocompetent child with Haemophilus influenzae disease.** *Emerg Infect Dis* 2009;5(2):355-7.
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11. Weinberg P, Weinberg M, Maloney, S. **Traveling safely with children**. In: Centers for Disease Control and Prevention. *CDC health information for international travel 2010 (Yellow Book).* Atlanta: U.S. Department of Health and Human Services, Public Health Service, 2009.
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Regional TB Program

The TB program has worked with MOPH since 2003 to develop initiatives and research that lead to effective TB control policies. Program staff also provide technical assistance to other countries in the region, including Cambodia, Laos, and Vietnam, and to WHO regional offices in New Delhi and Manila. Among the strategies used to reduce the burden of TB in Thailand and Southeast Asia are developing models, measuring incidence and mortality, and promoting best practices. The program also collaborates with multilateral, national, and NGO partners on human capacity development.

In 2004, the TB Program began working with MOPH, the Bangkok Metropolitan Administration (BMA), the Research Institute of Tuberculosis (Japan), and provincial partners to develop the Thailand TB Active Surveillance Network. The network is a demonstration project being conducted in five provinces and one national referral hospital. It seeks to evaluate strategies for improving diagnosis, treatment, and program management of TB, TB/HIV and multidrug-resistant (MDR)-TB. Core activities include active surveillance, monitoring, and evaluation of TB cases in public and private healthcare facilities; electronic recording and reporting; model TB/HIV interventions; and rapid culture

The Thailand TB Active Surveillance Network provides training in operational research projects, such as new approaches to TB screening among people with HIV.

About TB

Established 2003

In-country Staff
1 CDC direct hire
8 locally employed staff

Sara Whitehead, MD, MPH, Director

Purpose
To reduce the burden of TB in Thailand and Southeast Asia through technical assistance and operational research

FY 2009 Program Budget
$1.4 million

Fine-Tuning New Tests in TB Laboratories

As part of an effort to improve TB diagnosis and prevent the spread of resistant forms of the disease, TB researchers have developed a new tool to monitor laboratory quality in Thailand.

Reliable, timely laboratory results can mean that patients with resistant disease start appropriate treatment quickly. Fewer infections then spread throughout the community, and drug resistance develops less often. Finding practical TB diagnostics has been a challenge for resource-limited settings.

Thailand, like many countries outside the developed world, has relied on smear microscopy, a relatively quick and simple technique for microbiological examination. But microscopy misses lots of cases, especially in people with HIV, and it can't identify resistance. TB leads all other causes of death in people with HIV.

Culturing TB bacteria on liquid media is more accurate and sensitive than microscopy, but is also more complicated and expensive. In 2007, liquid culture was recommended by WHO for high-burden TB countries (Thailand is 18th on the list), yet so far no global consensus has emerged on how to monitor the quality of lab performance.

Laboratory consultants from the Thailand TB Active Surveillance Network (TBNet) began developing indicators in late 2006. They reviewed the existing literature, consulted with subject matter experts, and used their program experience to create evaluation markers. Personnel at each of the network's laboratories were trained in the use of the new guidelines.

The Thailand indicators have since been included in WHO training materials. They were also published in a major TB journal, and were recently adapted and endorsed for use by the national lab network in India, home of the world's largest TB burden.

and susceptibility testing at the province level. The Network also provides a platform for operational research projects such as the evaluation of new diagnostics and of new approaches to TB screening among people with HIV.

Many of the activities included in this project are recommended in WHO's Second Global Plan to Stop TB. The Active Surveillance Network has demonstrated that implementation of the Second Global Plan to Stop TB in Thailand would increase TB case finding, MDR-TB diagnosis, linkage of HIV patients to HIV care and treatment, and collaboration with private sector TB providers.

Major Partners

In Thailand, TB activities are planned in close collaboration with Royal Thai Government partners, including MOPH, BMA, regional offices of disease control, and provincial public health offices. In some provinces, activities are coordinated with nongovernmental partners, including the Thai Red Cross, Médecins Sans Frontières, World Vision Foundation of Thailand, and the International Organization for Migration.

In the Southeast Asia region, TB Program staff work closely with national TB and HIV programs, nongovernmental organizations, and intergovernmental organizations, such as WHO.

Because TB is a priority area for the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), Thailand and regional activities are coordinated with CDC's Global AIDS Program, USAID, and other U.S. government partners. The program's primary sources of funding are USAID and PEPFAR. Funds from these sources come directly to the TB program (see budget in *About TB* sidebar); additional funds are also overseen by the TB program, but are not counted in the budget because they are programmed directly through PEPFAR.

Recent Accomplishments

In Thailand, Cambodia, and Vietnam, CDC with USAID support completed a large multi-country study, "Improving Diagnosis of TB in HIV-Infected Patients: The ID-TB/HIV Study." This multi-center, cross-sectional study enrolled over 2,000 HIV-infected patients from five sites across Thailand, Cambodia, and Vietnam to determine the optimum algorithm to screen for and diagnose TB in HIV-infected patients. Key findings were that a combination of three symptoms is sufficient to rule out TB in some patients, and that most of the remaining patients need liquid culture to reliably diagnose TB. Results from this study were shared with government and other partners in the three countries, and have been used to revise national guidelines as well as guidelines for the WHO WPRO region. A number of follow up studies, including cost-effectiveness evaluation and performance of the algorithm in routine clinical settings, are ongoing.

Drug-resistant TB is an emerging concern in the region and CDC supported two Thailand laboratories to validate a new rapid test for drug resistance. The test has the potential to reduce the time it takes for clinicians to confirm drug resistance from 2-4 months to a few days. This reduction means that patients can get on appropriate treatment much more quickly, both improving their outcomes and preventing transmission of this serious form of TB to others.

In the Thailand TB Active Surveillance Network, CDC developed a curriculum and conducted training for clinicians to promote rapid access to life-saving antiretroviral therapy for HIV-infected TB patients. This initiative was evaluated and shared with a broad range of key stakeholders. Following the evaluation, MOPH requested CDC to revise the curriculum for use nationwide.

Several other components of the Thailand TB Active Surveillance Network have been

incorporated into national policies and programs. The network's electronic recording and reporting system was adopted by many other laboratories and regional disease control offices around the country, and is being used to implement Global Fund-supported TB activities. Findings of high rates of drug-resistant TB in provinces bordering Burma prompted initiatives to strengthen diagnosis and treatment of drug-resistant TB.

CDC projects in Thailand, Cambodia, and Vietnam have now documented the unique epidemiology of HIV-associated TB in Southeast Asia. Most important, these studies have documented effective public health strategies for increasing HIV testing of TB patients, improving TB screening of HIV patients, and have documented the reduction in mortality associated with providing co-trimoxazole and antiretroviral therapy to HIV-infected TB patients.

Current Activities

In the Thailand TB Active Surveillance Network, CDC continues to support the development of model programs and evaluate new interventions. The program is currently evaluating the public health impact of implementing a new rapid test for drug-resistant TB. This project will assess the effect of the new test result on doctors' decisions about treating their patients.

The regional TB program collaborates with IEIP/GDD colleagues to conduct enhanced surveillance for TB among people with acute pneumonia in two sites for population-based surveillance of respiratory disease. This work is helping to identify people with TB who would otherwise be missed, thus preventing treatment delays and further transmission of TB within healthcare facilities.

In follow-up to the ID TB/HIV study, CDC is working with partners at the Thai Healthcare Intervention and Technology Assessment Program (HITAP) to determine the cost-effectiveness of the newly defined TB screening algorithm for people with HIV. Because the new algorithm includes more expensive diagnostic tests (see sidebar, previous page, *Fine-Tuning New Tests in TB Laboratories*), it is critical to define whether its improved sensitivity is cost-effective overall.

Together with the WHO WPRO office, CDC is providing technical support to the Tropical Disease Foundation in Manila, the Philippines, to become a Model Center for MDR-TB management. This Center will provide training and medical consultation in MDR-TB for the Asia-Pacific region.

The TB Program will begin assessments aimed at helping policy makers make decisions about preventing TB transmission in healthcare facilities. Measuring air flow is an important part of designing effective infection control strategies for airborne diseases like TB.

In Cambodia and Vietnam, the TB Program continues to provide technical support for initiatives to increase TB screening of HIV patients and HIV testing of TB patients in multiple provinces, and to expand TB culture capacity. In Cambodia, the feasibility and yield of contact tracing of TB patients is being evaluated to see if this is an effective strategy to increase TB case finding. In Vietnam, TB preventive therapy pilot projects are also being completed.

At the regional and global level, CDC continues to provide technical assistance to WHO and to GAP programs. CDC TB program staff are working with the WHO to conduct a meta-analysis of studies on the diagnosis of TB in HIV-infected patients, and will contribute to revising WHO policy guidelines on this issue. TB laboratory staff acted as co-facilitators at GAP-supported TB laboratory training in South Africa and will continue to provide this kind of support.

Plans for FY 2010

In follow up to the three-country ID TB/HIV Study, demonstration projects in Thailand, Cambodia, and Vietnam will implement the newly recommended TB screening and diagnostic algorithm for people with HIV. Its performance and clinician acceptability in a routine programmatic setting will be evaluated. At the implementing sites isoniazid preventive therapy, an underutilized measure for people with HIV, will also be supported in the context of improved TB screening.

Infection control is a new area of focus. Although the need to prevent TB transmission in healthcare facilities is widely recognized, the efficacy of infection control interventions is not well documented and policy makers have little information available to make decisions about where to target resources. Several projects in Thailand and Vietnam will assess the current status of infection control in health care facilities and evaluate the impact of initiatives to improve it.

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